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<p>Environmental Restoration Project Standard Operating Procedure</p> <p>for:</p> <h1>Field Sampling of Core and Cuttings for Geological Analysis</h1>				
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Revision Log

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Field Sampling of Core and Cuttings for Geological Analysis

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Field Sampling of Core and Cuttings for Geological Analysis

1.0 PURPOSE

This procedure states the responsibilities and describes the process for subsampling core or cuttings in the field for geological analysis on the ER Project. Specifically, this procedure covers the activity and associated documentation for collection and transport of core or cuttings subsamples from a drill site directly to EES-1 sample preparation or analysis sites at LANL. The examination or subsampling of materials at the ER Sample Management Facility (SMF) is not covered under this procedure; for such activities the appropriate governing SOPs should be employed.

2.0 SCOPE

This SOP is a mandatory document and shall be implemented by all ER Project participants when collecting geological samples of core or cuttings in the field for the ER Project

3.0 TRAINING

- 3.1 All users of this SOP are trained by reading the procedure. The **users** shall ensure the training is documented in accordance with QP-2.2, and is entered appropriately in the ER Project Training Database located at <http://erinternal.lanl.gov/Training/Training.asp>.
- 3.2 The **Geology Task Leader (TL)** will monitor the proper implementation of this procedure and ensure that relevant team members have completed all applicable training assignments in accordance with QP-2.2.

4.0 DEFINITIONS

- 4.1 Core — A core is a cylindrical section of rock, or fragment thereof, that is taken as a sample of the interval penetrated by a core bit and that is brought to the surface for examination and/or analysis.
- 4.2 Cuttings — Cuttings are chips of rock produced during drilling that are removed from the borehole by circulation of drilling fluids (gas, foam, or liquid).
- 4.3 Field Implementation Plan — The Field Implementation Plan (FIP) is a document summarizing the location, objectives, and detailed operations for a specific borehole. The FIP allows documentation of selected options

available in this procedure, such as goals for field collection of either core or cuttings samples for geological characterization.

- 4.4 Sample — A sample is a physical entity, collected in the field, representative of the whole, that is the original source material for subsequent analysis and testing activities.
- 4.5 Subsample — A subsample is a selection or aliquot from a sample that may or may not be representative of the sample. In general, only subsamples will be collected for geological analysis, leaving some remnant of the parent material for future analysis.

5.0 BACKGROUND AND PRECAUTIONS

- 5.1 This SOP shall be used in conjunction with an approved SSHASP. Also, consult the SSHASP for information on and use of all PPE.
- 5.2 Appropriate eye protection must be used with chisels and hammers.

6.0 RESPONSIBLE PERSONNEL

The following personnel are responsible for activities identified in this procedure.

- 6.1 Geology Task Leader
- 6.2 Sample Requester
- 6.3 ER Project Participants
- 6.4 Users

7.0 EQUIPMENT

A checklist of suggested equipment and supplies needed to implement this procedure is provided in Attachment A. Alphabetized descriptions of commonly used pieces of equipment, their advantages, and their limitations are listed below.

- 7.1 Chisels—For subsampling of core it may be necessary to obtain core material with a chisel. Appropriate PPE (eye protection) must be used when striking a chisel.
- 7.2 Hammers—For use with chisels in obtaining core subsamples. Appropriate PPE (eye protection) must be used when striking a chisel or rock with a hammer.
- 7.3 Markers—Indelible markers should be used for marking sample identifications on sample bags.

- 7.4 Sample bags—Bags for collection and storage of geologic samples will generally be clear plastic, with either ziploc[®]-type (preferred) or twist-tie closure.
- 7.5 Sieves—Sieves for preparing size splits from whole cuttings samples will generally be 10 mesh (preferred), 35 mesh, or other mesh as necessary.
- 7.6 Spoons—Spoons for handling cuttings may be either plastic or metal.

8.0 PROCEDURE

Note: Subcontractors performing work under the ER Project's quality program may follow this standard operating procedure (SOP) for collecting geological samples from cuttings or core, or may use their own procedure(s) as long as the substitute meets the requirements prescribed by the ER Project Quality Management Plan, and is approved by the ER Project's Quality Program Project Leader (QPPL) before the commencement of the activitie(s).

Note: ER Project personnel may produce paper copies of this procedure printed from the controlled-document electronic file located at http://erinternal.lanl.gov/home_links/Library_proc.htm. However, it is their responsibility to ensure that they are trained to and utilizing the current version of this procedure. The author may be contacted if text is unclear.

Note: Deviations from SOPs are made in accordance with QP-4.2, Standard Operating Procedure Development and documented in accordance with QP-5.7, Notebook Documentation for Environmental Restoration Technical Activities.

- 8.1 The field collection of samples or subsamples from core or cuttings, for geological characterization, permits timely analysis of fundamental geological properties for the ER Project and completion of borehole summary reports. In specific instances geological data may also be collected for quick turnaround where input is desired for determining stratigraphic depth (e.g., when decisions must be made about deepening the drill hole). The types of geological data to be obtained may include binocular microscope petrography, thin-section petrography, analysis by scanning electron microscope (SEM), analysis by X-ray diffraction (XRD), analysis by X-ray fluorescence (XRF), instrumental neutron activation analysis (INAA), or radiometric dating.
- 8.2 Field collection of samples or subsamples from core or cuttings for geological characterization is provided for on a borehole-by-borehole basis as specified in the Field Implementation Plan (FIP) for each borehole. An approximate number of samples or subsamples to be collected, and the goals for collection of core, cuttings, or both, will be specified in the FIP. The actual number of samples or subsamples collected for geological

characterization will be a function of features observed and geological units encountered while drilling the borehole.

- 8.3 The field collection of samples or subsamples from core or cuttings for geological characterization is accomplished by a member of the field support team or may be done by the sample requestor. Wherever possible, the amount of material sampled is minimized to preserve representative material for subsequent transfer from the field or curation at the Field Support Facility (FSF) in accordance with ER SOP-12.01, Field Logging, Handling, and Documentation of Borehole Materials.
- 8.4 Whenever core or cuttings samples or subsamples are collected in the field, the sampled materials will be placed in a container marked with a unique designation that includes the borehole identifier and the sample depth. If cuttings subsamples are collected, the designation will include information on whether the subsample is bulk or sieved.
- 8.5 Containers for geological samples or subsamples will typically be ziploc[®]-type plastic bags. Other containers may be used as necessary.
- 8.6 Custody of the samples and subsamples for geological analysis will be transferred from the field support personnel to the sample requestor when the samples or subsamples are removed from the drill site. This transfer of custody will be documented by listing the samples or subsamples and the date of transfer in the EES ER Sample Storage Logbook.
- 8.7 Samples or subsamples for geological analysis will be logged into the EES ER Sample Storage Area and a record of the storage location within the ER Sample Storage Area will be provided in the EES ER Sample Storage Logbook.
- 8.8 Lessons Learned

During the performance of work, **ER Project participants** shall identify, document and submit lessons learned in accordance with QP-3.2, Lessons Learned located at: http://erinternal.lanl.gov/home_links/Library_proc.htm.

9.0 REFERENCES

ER Project participants may locate the ER Project Quality Management Plan http://erinternal.lanl.gov/home_links/Library_proc.htm.

The following documents are cited within this procedure.

QP-2.2, Personnel Orientation and Training

QP-3.2, Lessons Learned

QP-4.2, Standard Operating Procedure Development

QP-5.7, Notebook Documentation for Environmental Restoration Technical Activities

SOP-12.01, Field Logging, Handling, and Documentation of Borehole Materials

10.0 RECORDS

The **sample requester** is also responsible for maintaining records of sample or subsample receipt in the EES ER Sample Storage Logbook, and for submitting the following records (processed in accordance with QP-4.4, Record Transmittal to the Records Processing Facility) to the Records Processing Facility.

10.1 Completed EES ER Sample Storage Logbooks

11.0 ATTACHMENTS

Attachment A: Equipment and Supplies Checklist for Field Sampling of Core and Cuttings for Geological Analysis (1 page)

[Using a token card, click here to record "self-study" training to this procedure.](#)

If you do not possess a token card or encounter problems, contact the RRES-ECR training specialist.

Equipment and Supplies Checklist for Field Sampling of Core and Cuttings for Geological Analysis

- _____ Chisels
- _____ Eye protection
- _____ Hammers
- _____ Markers, indelible
- _____ Plastic bags (ziploc[®]-type preferred)
- _____ Sieves (10 or other mesh; 10-mesh preferred)
- _____ Spoons (plastic or metal)

SOP-9.10

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